

# FLIGHT

*The*  
AIRCRAFT  
ENGINEER  
&  
AIRSHIPS

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

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## Flight

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## EDITORIAL COMMENT.



Well  
Done!

WHEN the two American Douglas world-cruisers, carrying Lieut. Lowell Smith and Lieut. Arnold, Lieut. Nelson and Sergt. Ogden respectively, arrived at Boston on September 6, they had virtually accomplished the tremendous task of circling the globe by air. They still have to cross the American continent, it is true, but compared with the stages already covered this should prove a relatively simple matter, and, barring accidents, should be successfully carried through within the next week or so. It is no exaggeration to say that the entire world has followed the flight with the keenest interest, nor that without exception the aviation world in general, and the British aviation community in particular, will mix with its applause a sigh of relief that the undertaking has been carried through to a successful conclusion without the loss of life. Many must have been the occasions during the period between March 17 and September 6 when it was toss and go whether some particular emergency was successfully met or sudden disaster cut short the attempt. That two out of the four machines which started should have got through is testimony to the skill and daring of the crews, no less than to the perfect organisation which alone made the flight possible, and the regret of Major Martin, who crashed into a mountain on one of the Alaskan islands during a fog quite early in the world-flight, must have become tempered with satisfaction as he learned of the way in which Lieut. Lowell Smith took over the leadership and carried the expedition through.

It is often asked by those who have not made a special study of aviation what is the use of such a flight. To answer that question is a matter of some difficulty, not because the usefulness is hard to discover, but rather on account of the innumerable directions in which the lessons learned can be of value to future aircraft development.

Thus from the technical standpoint the world-flight will undoubtedly prove to have been of more than ordinary value. It is on flights such as this that any small defects in technical equipment are

## DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:—

1924

- Sept. 27-28 Eliminating Tests for Light 'Plane Competition at Lympe.
- " 27-29 Wireless Exhibition at Albert Hall, Kensington.
- Oct. 4 2-Seater Light 'Plane Competition at Lympe.
- Oct. 2 .... Aero Golfing Society. Autumn Meeting, at Moor Park Golf Club, for A.G.S. Challenge Cup presented by Cellon (Richmond) Ltd.
- " 2 .... Lieut.-Col. H. T. Tizard, A.F.C., F.R.Ae.S. (of the Department of Scientific and Industrial Research), Chairman: Inaugural Lecture.
- " 4 .... Grosvenor Challenge Cup Race at Lympe.
- " .... Schneider Cup Race, Baltimore.
- " 16 .... Dr. A. Rohrbach (of the Rohrbach Metall-Flugzeugbau Co.) "Large All-Metal Sea planes," before R.Ae.S.
- " 30 .... Major J. S. Buchanan, A.F.R.Ae.S. (of the Technical Department, Air Ministry): "The R.Ae.C. Light Aeroplane Competitions," before R.Ae.S.
- Dec. 5-21 Paris Aero Show.

most rapidly found out. The intensity and searching nature of the test are far above those met with in ordinary flying, either service or commercial, and we do not doubt that in the six or seven months of flying the gallant American aviators have found out more than would normally be discovered in almost as many years. The wear and tear on engines, for instance, must have disclosed minor defects in design or material which under less strenuous conditions might not have come to light for a very long time. These defects can, and doubtlessly will, be remedied in the future, with resulting increase in reliability.

Then there is the manner in which the aeroplanes themselves stand up to extreme variations in climate. The effect of heat and cold, rain and frost, moisture and fogs, on the wood and metal members and on the fabric covering is ascertained, and the value of the knowledge gained in its application to future designs will be readily appreciated.

One could go on enumerating directions in which technical knowledge is increased by such a flight as that just completed, but sufficient has, perhaps been said to indicate broadly the lines along which the experience gained may be expected to be beneficial to future development. The credit rests, in the first place, with the gallant aviators who undertook the flight, but also with the nation who, by its unstinted support, its thorough organisation, and its policy of Government encouragement made the attempt possible. To the fliers themselves and to the American nation we extend our heartiest congratulations. There is no necessity for lengthy and elaborate phrases. All our admiration for and satisfaction with the splendid achievement can be summed up in two words: Well done!

## The Lympne Machines

Now that most of the machines entered for the forthcoming competitions for light 'plane two-seaters are nearing completion, it becomes possible to form an idea of the way in which designers have attempted to solve the problems of wide-speed range, which is the main feature aimed at in the drafting of the rules. One is at once impressed by the large proportion of biplanes. Out of the 18 machines entered only eight are known to be monoplanes, the rest are biplanes. In view of the preponderance of monoplanes at last year's Lympne meeting, this may appear somewhat surprising, but it should be remembered that this year a premium is placed on low stalling speed, and that, in a machine carrying two, to attain this usually means a rather large monoplane. This no doubt explains to a great extent the choice of the biplane type for 1924.

Another feature which seems likely to be found on very many machines is some form of wing flap gear. Normally there may not be any very pronounced advantage in this means of reducing stalling speed, especially in machines so lightly loaded, but for competition purposes the lowering of the stalling speed by even a couple of miles per hour will result in a very considerable gain in the marks awarded.

From a constructional point of view one cannot help being impressed by the general excellence of the workmanship put into these machines. In fact, one is almost tempted to say that unnecessary care has been bestowed on details. On the other hand, this cannot be without its effect on the problem of weight-saving, and so may have been necessary for competition purposes.

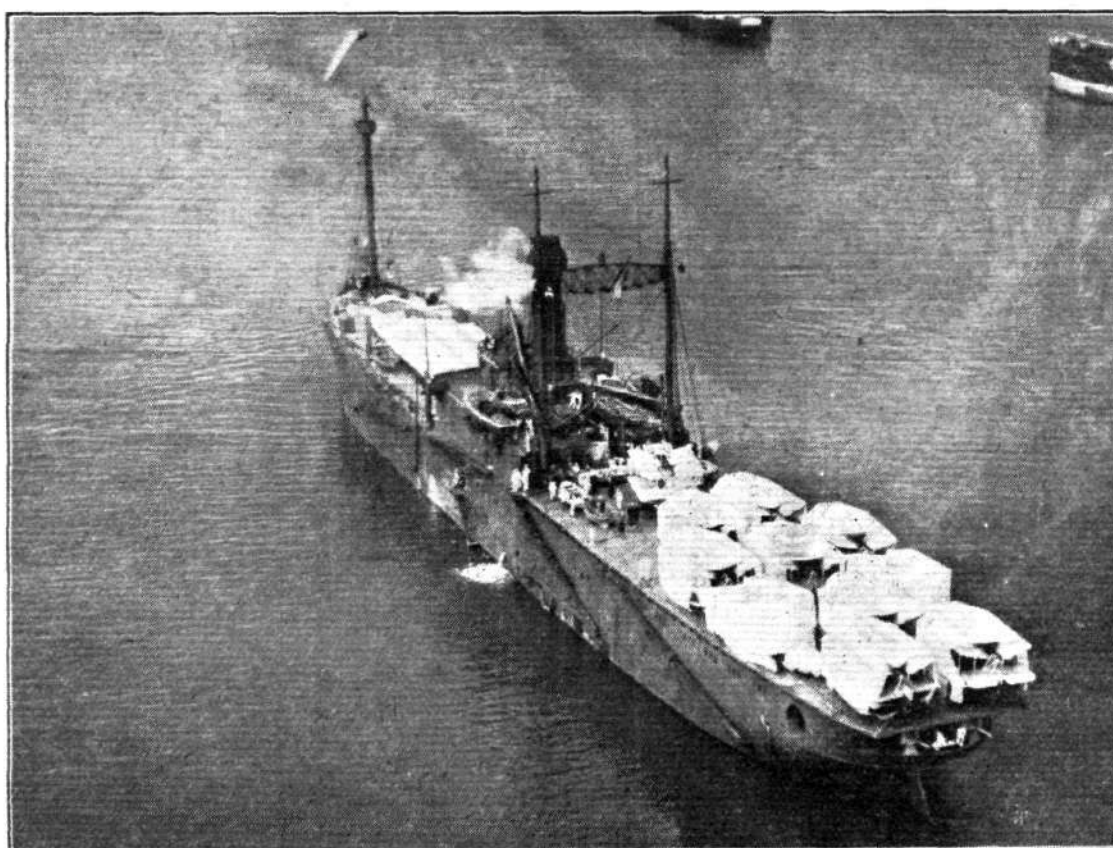
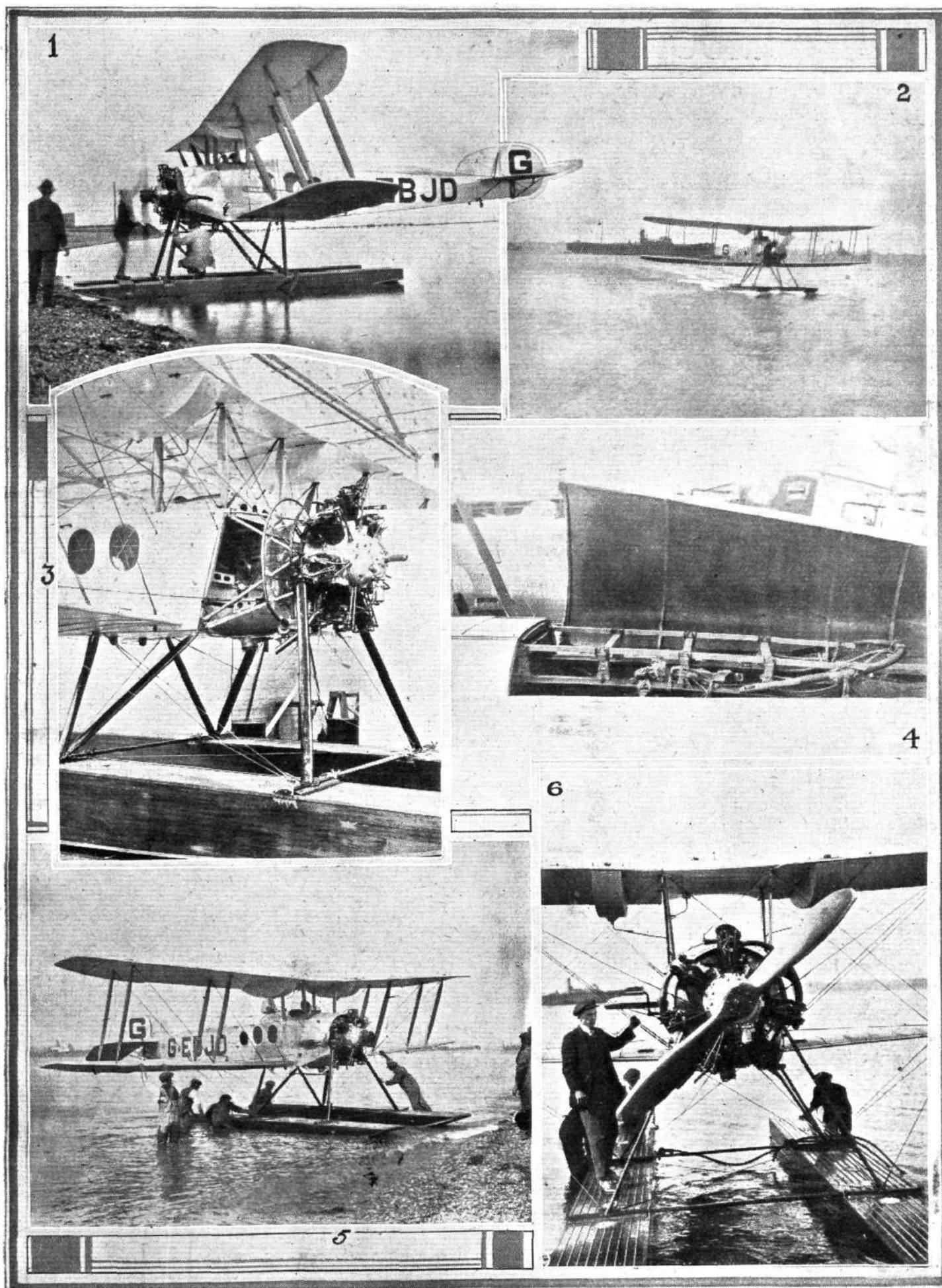


Photo. by Aerofilms, Ltd.

**MOROCCO BOUND:** Our photograph shows the Spanish aircraft carrier "Dedalo," with a number of Supermarine flying boats stowed on deck, steaming down Southampton Water en route for Morocco. No doubt upon arrival the Spanish forces will greet them with "the 'moor' the merrier."





**AN ARCTIC AVRO:** These photographs show the Avro-“Lynx” of the Oxford University Arctic Expedition, which, under Mr. George Binney, has been making good use of the seaplane. The machine and its Armstrong-Siddeley “Lynx” carries a very heavy load, but nevertheless on test got off the water easily. The general views, 1 and 5, give a good idea of the lines of the machine. In 2 it is seen taxiing, while 3 shows the special engine mounting designed for the “Lynx.” A cowl is, of course, fitted for actual flying in the Arctic. 4 shows the Norwegian sled carried under the deck fairing. The front view, 6, shows the long floats, and the two extra petrol service tanks under the top plane. A third tank is built into the top centre-section.

# MOORING DIRIGIBLES AT SEA

An Interesting Experiment with the U.S. Airship "Shenandoah"

IN our issue for August 7 last we made brief reference to an experiment which was to be carried out by the U.S. Navy, the object of which was to ascertain whether the U.S. rigid airship Shenandoah could be moored to a moving ship at sea. We have received from the Naval Air Station at Lakehurst, N.J., a brief report on this experiment, which we publish herewith, together with illustrations of the actual test.

This experiment of anchoring a rigid airship to a mobile mast was carried out under favourable air conditions during the evening of August 8, when the Shenandoah, acting under instructions from the Bureau of Aeronautics, proceeded from Lakehurst to the "Patoka" lying in Naragansett Bay.

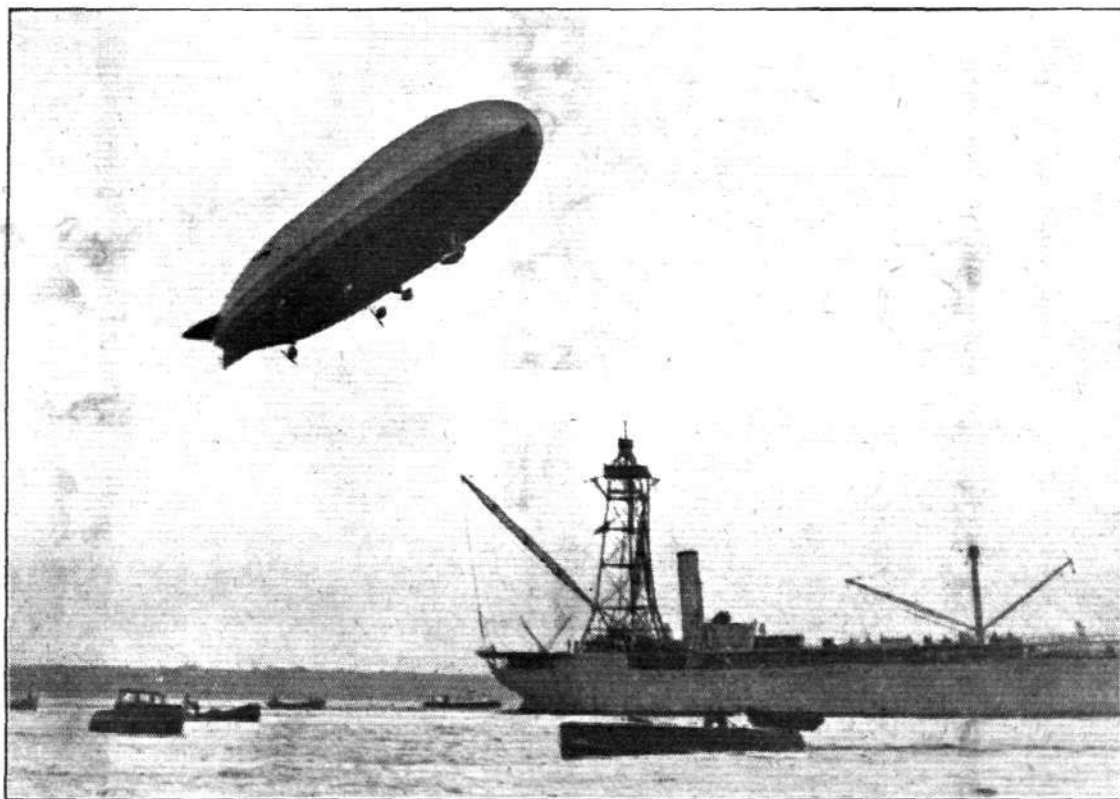
The arrangements laid down for carrying out the manoeuvre embraced two schemes, one analogous to the method of mooring to a land mast and the other, which will in all probability be adopted as the standard, being a variant of the first, differing only in the method of receiving the ends of the yaw guys. The main lay-out was as follows:—

On receipt of Shenandoah's signal "All ready," the "Patoka"—with yaw booms topped into position and yaw lines led through the booms and up to the masthead platform—steamed directly into the wind, with just sufficient head to

in attendance as stated. At an altitude of 300 ft. the wind apparently varied from W.S.W. to due W., this causing the airship to drift off the port quarter as soon as she lost way. On a second attempt the Shenandoah was brought into position for dropping her line by going to starboard of "Patoka" about 500 ft. astern and drifting back across her wake.

The wire was dropped from about 300 ft. and secured by the speed boat. The end proved somewhat difficult to hold, due to the tendency of Shenandoah to rise and drift, but was secured at a second attempt and taken to the boat holding the "Patoka's" wire and connected. On subsequent occasions it would seem an improvement for "Patoka's" line to be moved towards the Shenandoah's instead of remaining relatively stationary—while the operation could be further simplified by reeling out a minimum of wire from the "Patoka."

Immediately on connection the winch started to heave in, and the difference in wind direction between surface and airship altitude, almost 90 deg., caused the bight in the hauling line to foul the fitting at top of port boom. This was cleared by Shenandoah going astern while winch reversed,



Mooring the "Shenandoah" at Sea: This view shows the airship being hauled down to the mooring mast mounted on the tank steamer "Patoka."

keep steerageway. In her wake followed four power boats—one about 500 ft. astern, holding the end of "Patoka's" main hauling line. Two others—one off each quarter, at a distance of about 600 ft., to stand by in readiness to take up the ends of the Shenandoah's yaw guys if necessary. The duty of the fourth boat was to reclaim the end of the airship's line when dropped and to proceed to first boat and connect the two ends. This method, if adopted, would parallel the mooring to a land mast. In the manoeuvre, however, this plan was simplified by using pilot blocks to carry the ends of the yaw guys down the main line to the mast head and there to connect to ship's wires. The mast ram was not inclined until after both yaw lines were connected in order to facilitate this operation. It being anticipated that under the conditions prevailing the operation would occupy 30 minutes, the only consideration for the "Patoka" was to allow herself a clear course of a half hour steaming.

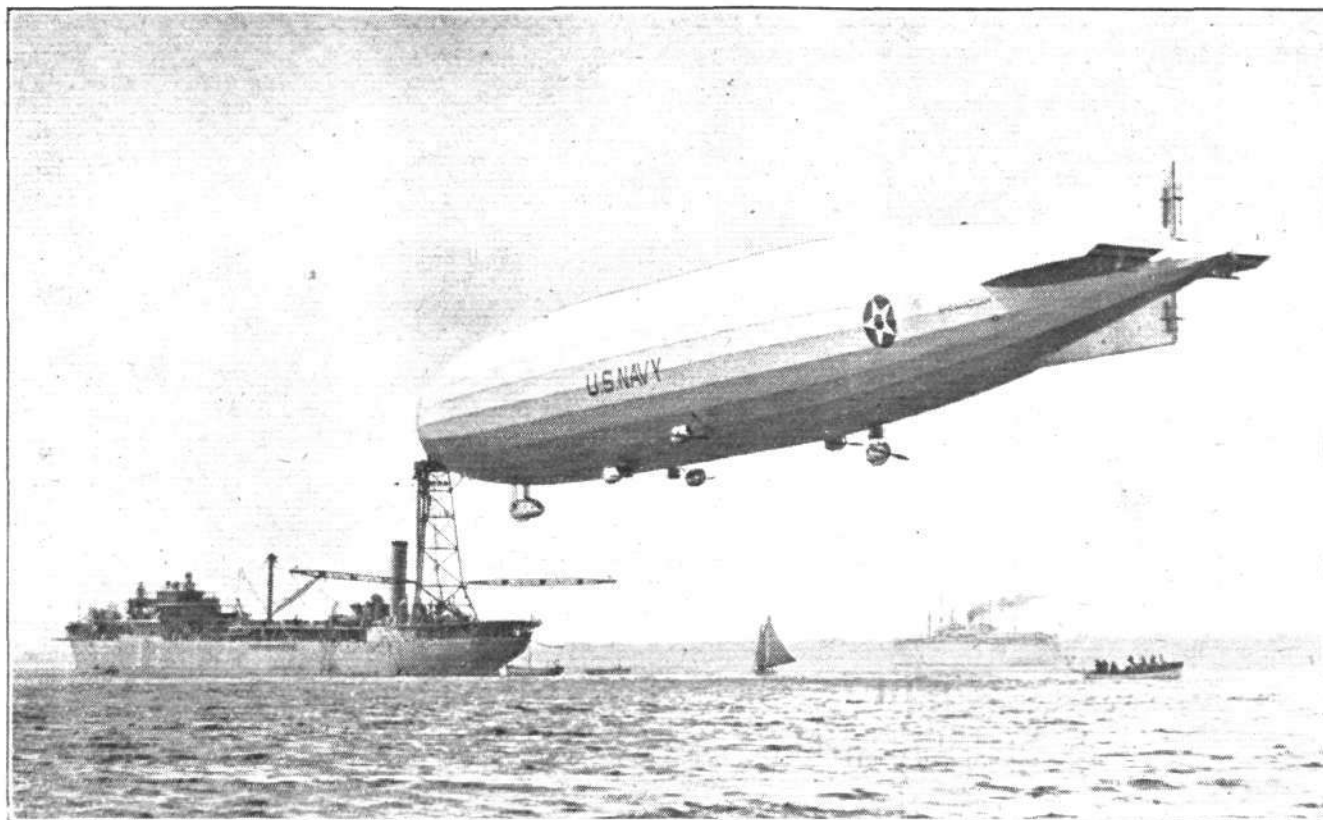
The portion of Naragansett Bay chosen was between the mainland and Prudence Island, which has a direct north-south channel of over 10 miles in length and about 4 wide, and at the time of the experiment the surface wind was about S.S.W. in direction and 18 knots per hour.

On the approach of Shenandoah the "Patoka" proceeded into the wind at about four knots with the power boats

and to avoid a repetition the "Patoka's" course was changed to coincide with Shenandoah's. This led the surface ship towards shoal water, but fortunately the mooring was concluded in time to avoid trouble, when the "Patoka" was again laid on her original course and moved off to her anchorage with the airship towing about 75 deg. over the port quarter. This incident seems to show the necessity for open water during future moorings.

When the airship was down to about 200 ft., the line tautened in a series of jerks due to a slipping clutch on the winch. This caused enough slack in the line to enable it to jump the sheave at the foot of the mast and jamb between the sheave and the bearing. It took 15 minutes to free, and showed the wire to be badly stranded. A manila rope preventer was fitted round the nigger head to take up the strain until sufficient good wire was coiled on drum. The trouble was caused by the type of fitting used, the sheave being too small in diameter and without guard plates. A further disadvantage is the fact that the sheave is fitted with compression springs which tend to increase rather than dampen out the uneven hauling of the winch line. The running of yaw lines by pilot blocks from the Shenandoah proved quite satisfactory. The booms are too heavy in construction and cumbersome in operation, but proved of great value





**MOORING THE "SHENANDOAH" AT SEA:** The "Patoka," with the "Shenandoah" safely moored, steaming to her anchorage.

during the mooring, as the wind dropped from 18 knots to approximately 5 knots in two hours previous to the Shenandoah's nose entering the mast cup.

The mooring was conducted under favourable conditions, with the ship in perfect trim and equilibrium, and gradually becoming heavier as the sun went down. Probably about 4,000 lb. of water ballast was discharged during the time of mooring. The operation, although consuming almost two hours, could be considered successful, and obviously experience, especially on the "Patoka's" part, will materially decrease the time and hence the risk of mooring. One item to be given serious consideration, though not actually a part of the mooring, is the nuisance caused both on mast platform and in control car, by the gas fumes and smoke discharged from the "Patoka's" funnel. [Note.—The latter, it will be seen, is close up to the mooring mast.—ED.]

Except for minor mechanical defects, the experiment may safely be written down a success, and will be simplified on future occasions by dropping the airship's main mooring

wire into the water and dragging it up to and over the after deck of the surface ship, where it will be connected to the winch wire. This change in operation will greatly shorten the time of docking, and will do away entirely with the necessity of calling the boats away, as required at this first tie-up.

The airship swung completely through 360 deg. during her stay at the mast, and at no time showed to be in any signs of danger from fouling the top hamper of the surface ship, while her increased stability and riding qualities over the water were much superior to her behaviour over the sandy soil at Lakehurst. The "Patoka," a converted tanker, has the upper deck 30 ft. clear of the water, and the nose itself is 90 ft. in height above this deck. The booms are about 50 ft. long, and with the heels built on the mast structure about 30 ft. apart. When stopped in readiness for mooring they are slung upward and outward at an angle of 45 deg. On completion of mooring they are stowed horizontal with the top end forward.

## THE ROYAL AERO CLUB OF THE U.K.

### OFFICIAL NOTICES TO MEMBERS

#### TWO-SEATER LIGHT AEROPLANE COMPETITIONS.

The Two-Seater Light Aeroplane Competitions will be held at Lympne Aerodrome, near Hythe, Kent, commencing Saturday, September 27, 1924. The eliminating tests will take place on Saturday, 27, and Sunday, 28th insts. The Competitions will commence Monday, 29th inst., and close Saturday, October 4. Flying each day will start at 10 a.m. and close 6 p.m.

#### GROSVENOR CHALLENGE CUP

The following entries have been received for the race for the Grosvenor Challenge Cup to be held on Saturday, October 4 next, the concluding day of the light aeroplane flying week. The race is open to aeroplanes with engines not exceeding 1,100 c.c. Entries close Tuesday, September 23, 1924.

Entrant.	Aeroplane.
Sir George Stanley White, "Bristol" Brownie Monoplane.	
Bart.	
Robert Blackburn ..	Blackburn Biplane.
Commander James Bird ..	Supermarine "Sparrow" Biplane.
Lord Invernairn ..	Beardmore Monoplane.
A. V. Roe ..	Avro "Avis" Biplane.

#### AIR LEAGUE CHALLENGE CUP

The 100 mile race for the Air League Challenge Cup will take place at Lympne Aerodrome on Wednesday, October 1, 1924, at 2.30 p.m. This race is confined to three fighter squadrons of the Royal Air Force, No. 25 (Hawkinge), No. 32 (Kenley) and No. 56 (Biggin Hill). Each squadron will be represented by one flight of three Sopwith Snipe machines.

Members and Associates of the Royal Aero Club will be admitted free to the aerodrome during the whole week on presentation of their Club membership badges. Motor cars 2s. each.

Luncheon and teas may be obtained on the aerodrome.

The Club Headquarters will be the Imperial Hotel, Hythe. Terms (exclusive of luncheon) 17s. 6d. per day. Members are requested to make early application for rooms direct to the hotel.

Offices: THE ROYAL AERO CLUB,  
3, CLIFFORD STREET, LONDON, W. 1.  
H. E. PERRIN, Secretary

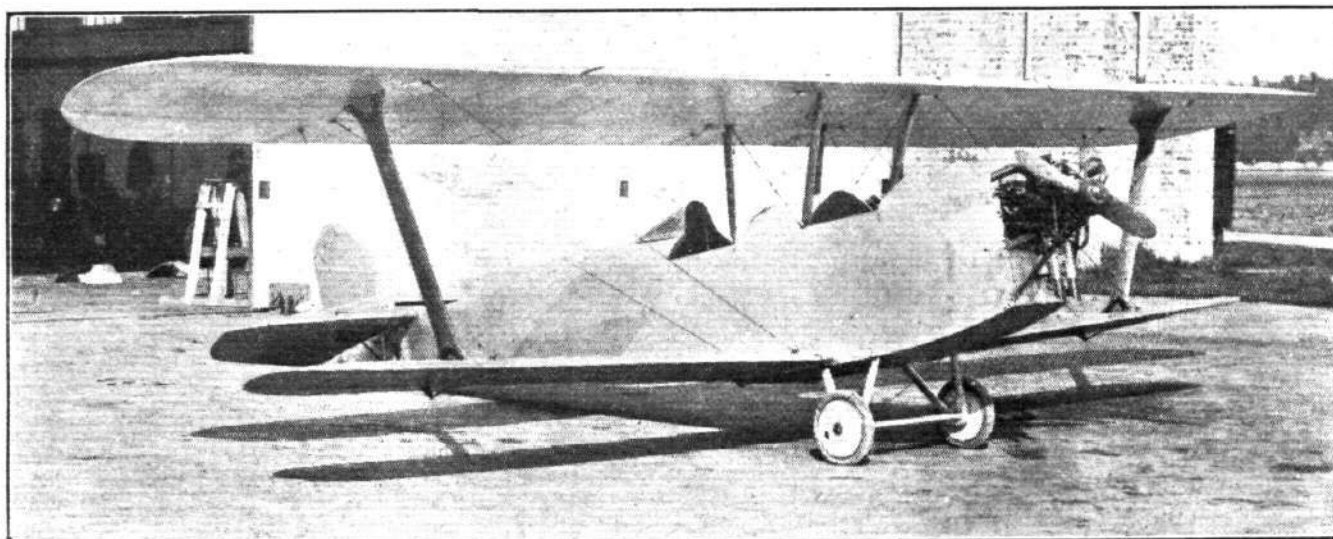
# LIGHT 'PLANE AND GLIDER NOTES

Those wishing to get in touch with others interested in matters relating to gliding and the construction of gliders are invited to write to the Editor of FLIGHT, who will be pleased to publish such communications on this page, in order to bring together those who would like to co-operate, either in forming gliding clubs or in private collaboration.

THE last day of entries at double fee for the Lympne Competitions was September 4, and as no fresh entries have been received by the Royal Aero Club, the complete entries list includes 18 machines. As it is now some little time since FLIGHT published the original list, it may be of interest to indicate briefly the character of the entries. It is assumed

pleted, and has been tested in flight by Mr. Piercey. It may be mentioned, without giving actual figures, that the machine came up to Mr. Shackleton's expectations in every way, the performance being practically identical with the estimated one, and the stability and controllability being good. The machine, which has been christened "Wee Bee I," is a thick-wing monoplane not unlike last year's A.N.E.C., and is fitted with Bristol "Cherub" engine.

Nos. 5 and 6 are Westland machines, one being a biplane and the other a parasol monoplane. We believe that at the moment it has not definitely been decided what engines will



Three-quarter front view of the Hawker light biplane, A.B.C. "Scorpion" engine.

that in the actual competitions the machines will carry the numbers allotted them at the time of entry. Nos. 1, 2 and 3 are Bristol monoplanes with Bristol "Cherub" engines. The three machines are alike in general lines, but it is expected that one of them at least will be of all-metal construction. There is also a possibility that the wing areas may differ somewhat, one type with smaller wings getting its marks nearer the upper end of the speed-range scale and the others nearer the lower end. The machines are low-wing pure cantilever monoplanes.

No. 4, the Beardmore light monoplane, has now been com-

be used, or rather which engine is to be fitted in the monoplane and which in the biplane. At present the choice is a Bristol "Cherub" and an Anzani. The biplane, which is of fairly normal type, with staggered wings, will be known as the Westland "Wood Pigeon," and the monoplane as the "Widgeon."

No. 7 is the Air Navigation and Engineering Co.'s monoplane, known as the "A.N.E.C. II." Designed by Mr. Shackleton before he joined Beardmores, this machine has a very strong resemblance to the "Wee Bee," but the engine chosen is a direct-drive Anzani. When we saw the machine last

The Udet "Kolibri," with 750 c.c. Douglas engine, has flown for 4 hours 39 minutes in the Rhön. Our photograph shows Herr Udet and his machine.





Light Planes at Rhön: The Baumer Aero "Roter Vogel" (No. 74) is fitted with a Douglas engine mounted in a somewhat unusual position. The machine is of usual glider type, and the placing of the engine, with long shaft to tractor airscrew, has evidently been chosen to obtain correct trim.

week, it was quite ready and waiting for the engine, a state of affairs which seems to be rather typical of most of the machines entered. In a general way the machine may be said to resemble last year's successful A.N.E.C. monoplane, and the workmanship put into it is of a very high order.

THE Short monoplane, No. 8, has already been illustrated in FLIGHT, scale drawings being published in our issue of July 24, 1924. An interesting feature of this machine is the all-metal (Duralumin) fuselage, which is built on lines similar to those adopted for the "Silver Streak" and "Springbok." The machine is a normal monoplane, with the wing placed approximately half-way down the sides of the fuselage. The general lines are very clean, the wings being of the cantilever type.

No. 9, the Supermarine "Sparrow," is a fairly normal biplane, but with short-span, narrow-chord, lower plane, and raked inter-plane struts. The "Sparrow" is the first land machine designed and built by this firm since the days of the War, and its performance will therefore be watched with interest. The engine is a three-cylinder radial air-cooled Blackburne.

Nos. 10 AND 11, the Avro machines, are biplanes, and the type will be known as the "Avis." Many interesting constructional features are incorporated in the design, notably in the wing-folding arrangement and wing bracing, but of this more anon. One of the machines will be fitted with a Bristol "Cherub" and the other with a three-cylinder Blackburne.

CONCERNING No. 12, the Blackburn machine, we have not been able to obtain much information beyond the fact that the machine will be a biplane. It appears that work in other directions has been so pressing that the light 'plane has been somewhat pushed aside, and consequently it is, perhaps, less far advanced at the moment than any other machine entered. It is to be hoped, however, that it will be ready in time.

No. 13, entered by Mr. Raine, of Christchurch, is at present by way of being a "dark horse," and it is not known of what type the machine is, nor what engine will be fitted.

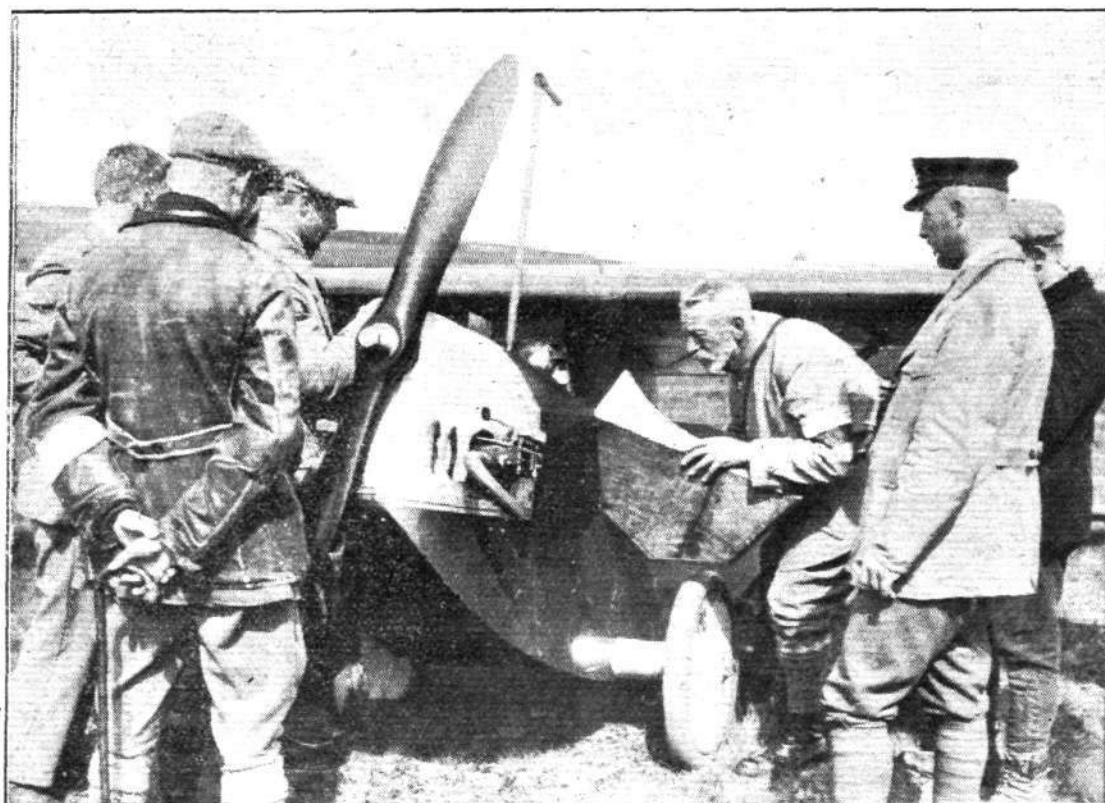
THE two Hawker machines, Nos. 14 and 15, are biplanes of very clean lines and of very light construction. One of the machines (they will be identical except for the engine) is

The Udet "Kolibri" and the Baumer "Roter Vogel" in the air together in the Rhön.





In the Rhön:  
Prince Heinrich  
inspects the  
Messerschmitt  
light 'plane which  
is fitted with a  
Douglas engine.



shown in a photograph on p. 564, from which the general appearance may be judged. We believe that Mr. Sidney Camm has had a good deal to do with the detail design, under Mr. Carter, who is now chief designer to the Hawker Engineering Co. The construction and workmanship are of a very high excellence, and a tremendous amount of trouble has been taken in order to reduce weight, with the result that the Hawker machines will probably be the lightest in the competitions. One machine has been fitted with the A.B.C. "Scorpion," while the engine for the second has not yet been decided upon.

No. 16, the Vickers "Vagabond," is an equal-span biplane with very pronounced stagger. Curiously enough, it has been built at the Avro works at Hamble, Vickers being so busy and full up at their Weybridge works that there was no time to build the "Vagabond." We must admit that Avros have made an exceedingly pretty job of the construction,

which is well up to the very high standard of the Vickers "Viget" of last year.

The last two machines entered, Nos. 17 and 18, are Parnall machines. They may be briefly described as being large editions of last year's "Pixies." One of them is a monoplane and the other a biplane, and one will be fitted with a Bristol "Cherub," while the other will probably have an Anzani, although the final choice has not yet been made.

As we have by now had the privilege of inspecting most of the machines entered, it may be of interest briefly to record our impressions. There is a surprisingly large percentage of biplanes, this type having been chosen by many designers in order to attain the low wing loading necessary to get low minimum speeds, and consequently high marks. Generally speaking, the machines are of normal design, and are to be regarded as miniature aeroplanes rather than as



The Martens  
family: This  
photograph  
shows Herr and  
Frau Arthur  
Martens standing  
by the Martens  
"Windhund"  
light 'plane.  
The machine has  
a Douglas engine.





No. 55, the  
Blume - Hentzen  
"Habicht," start-  
ing on a flight in  
the Rhön. This  
machine is fitted  
with a 750 c.c.  
Siemen's engine.

startlingly new departures from orthodox practice. A few exceptions from this rule there are, certainly, but in the main the machines follow usual practice. The workmanship is uniformly good, and in some cases one is sorely tempted to use superlatives. In fact, if there is anything to criticise it is mainly the quality of the work put into the construction of the machines. For little cheap knockabouts they are too well constructed, and the £150 or £200 "motor-cycle of the air" is still as far off as ever.

We are able to publish this week photographs of several of the German light 'planes. The Rhön meeting was rather ruined by the weather, and the closing date has been postponed until September 30. Nevertheless, a good deal of work has already been done. The flight to Kissingen and back was recorded last week, and the Udet "Kolibri," in addition to this event, has established a "record" for duration by flying for 4 hrs. 39 mins. The Bäumer Aero "Roter Vogel" has remained up for 2 hrs. 3 mins., during which period it is stated to have consumed but 1.7 gals. of petrol. "Flugsport," the German aviation journal, gives a list of

performances, among which appears a duration, on August 29, by Hentzen on "Habicht," of 10 hrs. 55 mins. Unless this is a misprint it seems likely that it was a combination of motor-flying and gliding.

THE lines of the machines will be fairly clear from our photographs. Most are high-wing monoplanes with the engine placed in the nose. Some, however, depart from this arrangement. For instance, the "Roter Vogel" has its Douglas engine mounted in the fairing behind the pilot's head, transmission being by a long propeller shaft. In this manner the centre of gravity is, presumably, brought back, thus preventing the necessity for a weight in the tail to trim the machine. Usually this is necessary when the pilot is placed ahead of the wing.

ARTHUR MARTENS' "Windhund" has very tapered wings, the chord being quite small at the tip. The taper is, moreover, a straight one, the centre section being parallel, the trailing edge straight, and the leading edge swept back in a straight line from the centre section.

A Weltensegler  
light biplane:  
The pilot is Herr  
Wolff Hirth,  
brother of the  
famous German  
pilot Hellmuth  
Hirth.



# REPORT OF THE AERONAUTICAL RESEARCH COMMITTEE, 1923-24

THE Annual Report of the Aeronautical Research Committee was issued recently, and is obtainable from H.M. Stationery Office, Imperial House, Kingsway, London, W.C.2, price 2s. 6d. net. As in previous years, the report contains a summary of the work done and progress made during the last twelve months, and in a short supplement to the report certain subjects are gone into rather more fully than in the report itself.

## Aerodynamics

In the commencement of the report it is pointed out that owing to the wide field of inquiry it is essential to concentrate on certain lines of research. Thus in the case of aerodynamics the report states that "attention has been paid chiefly to the control and stability of aeroplanes to the part exclusion of other work: this concentration on the attempt to secure low speed control is justified by the continued occurrence of accidents in which spinning is a primary or secondary feature; in the near future more attention will be paid to questions affecting performance, including the use of high lift and high speed wings."

On this subject it is stated that "the general research on complete models at the N.P.L., aiming at the determination of their stability characteristics, has been continued throughout the past year. The ordinary range of experiments has been extended to include angles of incidence considerably above the stalling angle, with a view to the investigation of control at low speeds. To obtain more directly comparisons between the model and the aeroplane, a special investigator has been appointed, under the direction of Prof. B. M. Jones, to calculate the initial movements of an aeroplane under a variety of conditions. An interim report of the first three months' work on this subject is now under discussion. Tabulations of data relating to the stability and control of different types of machines has also been undertaken for the Committee by the Airworthiness Department of the Air Ministry."

Concerning the light aeroplane development the report says:—"The new and important development of the light aeroplane is welcomed by the Committee as providing a possible avenue for rapid and relatively inexpensive trial of new characteristics of certain types of control. In this connection the Stability and Control Panel held a special meeting which the pilots of the various machines flown last October at Lympne were invited to attend. It became immediately evident that the pilots had had only a limited experience, frequently on but one type of light aeroplane, and it was, therefore, difficult to co-ordinate the experience gained. It is understood that in order to overcome this drawback five aeroplanes, selected by the Air Ministry from the successful types, have been ordered and allocated to the R.A.E. and Martlesham, for the accumulation of flying experience on them. It is of interest to note that pilots with their limited experience were generally of the opinion that light aeroplanes were much more comfortable for flying in indifferent weather than the ordinary higher-powered aeroplane."

## Airships.

In view of the revival of an airship policy the following reference to airships is of interest:—

"The Committee have on several occasions emphasised the importance of work on airships, and welcome the recent decision to return to the development of this type of aircraft. In their last annual report attention was drawn to the inadequacy of our present knowledge and the necessity, if design is to progress satisfactorily, for further full scale experiments on the aerodynamic forces which may be encountered and the structural problems involved. It is hoped that these experiments will be undertaken in connection with any large scale construction which is approved."

## Accidents.

A considerable amount of space is devoted to the subject of the investigation and prevention of accidents, and the report states that:

"The Committee note with pleasure that the Air Council agree with them in their view that the problem under consideration can only be solved satisfactorily and finally by securing a higher standard of technical knowledge in all ranks of the Royal Air Force and particularly among squadron officers. They welcome the steps which have been taken by the organisation of courses at Cambridge and at the Imperial College with this object, and they desire to co-operate

with the Ministry in every endeavour towards this end. But a general raising of the standard of technical knowledge must take time. Meanwhile accidents which, in the view of the Committee, are primarily due to the absence of this knowledge, continue to occur. Many machines are destroyed, while in some instances lives are lost; the Committee have felt it to be within their province to urge any steps that might reduce such losses. It is impossible at once to secure the necessary knowledge in the case of all officers. They hope it will not be impossible to provide for highly-skilled persons to make a correct technical diagnosis of each power plant failure immediately it occurs, and to report it in a manner which will enable the Ministry to take measures to prevent recurrence. In cases of difficulty the Ministry will, it is hoped, place the Sub-Committee in direct contact with the original sources of information, with a view to special investigation. By means such as these, the technical maintenance would be improved at least up to the standard of the Civil Transport Aircraft, and the general standard of technical knowledge would be raised. The Committee trust that the steps now being taken may lead to this desired end.

"Intimately connected with the same problem of prevention of accident is an investigation into the cause of incipient spinning in aeroplanes. Serious accidents in the majority of cases are due to one of three causes, some of which follow engine failure. The causes are (1) stall followed by nose dive, (2) stall followed by incipient spin, and (3) stall followed by a spin from which no recovery is made. The two latter are frequently present in designs of aeroplanes which show a particularly ready response to the movement of the controls. The peculiarities in design which lead to (3) are not adequately known, and the subject presents features which will involve lengthy investigation. This investigation is now started in connection with two as yet unexplained accidents on different types of aeroplanes."

Concerning the accident to the Bristol monoplane flown by the late Major Foot in the Grosvenor Cup race in June of 1923, the report of the Accidents Investigation Sub-Committee recalls that when the machine was approaching the village of Ottershaw, flying probably at over 120 m.p.h. and at a height of 800-1,000 ft., the port plane was seen to fold back. The pilot was killed instantly, and the wreckage was almost destroyed by fire. The following statement on the probable cause is of general interest, and is therefore given in full:—

"While, owing to the destruction of the wreckage by fire, and to other causes, much evidence of significance may have been lost, an important clue to the cause of this accident was found in the form of a fatigue fracture in the port front landing wire fitting at the wing end. The other landing wire, the rear one, had broken by a manifestly tensile fracture; all the flying wires were intact. Further, about 200 yards from the main wreckage, a piece, about 2 ft. long, of the bottom flange of the front port spar was found, indicating that the spar had broken in the air along the web to the root of the wing.

"From the above and other evidence the Sub-Committee were led to the conclusion that the accident was due to breakage of the port wing under down load caused probably by a convection current in the air. The weather conditions on the occasion in question were such that vigorous convection currents were probable up to the height of about 2,000 ft., so that a change from an up current of, say, 5 ft./sec. to a down current of similar magnitude would not be improbable. Such a change, it was found, would at the small angle of incidence in question easily account for a down load which would explain the breakage in the special circumstances.

"With relation to this monoplane accident, attention is drawn to the fact that in monoplanes of the braced type, as distinct from biplanes, it is frequently found that no provision is made for the duplication of the anti-lift wires upon which depends the strength of the wings under down load; and in order effectively to carry out design to meet the conditions imposed by the presence of convection currents in the air it is necessary to have means of measuring the magnitude of these currents at various heights. Recommendations have been made that steps be taken to gain this information, and that the load factors necessary to give adequate provision against down load for machines of different types, should be investigated."



### Aero Engines

The Engine Sub-Committee, in considering the subject of reliability, have come to the conclusion that an increase in the weight-power ratio of engines for commercial flying could not be tolerated on economic grounds, and consider that the ideal to be aimed at is improvement in design and in material.

Research has been put in hand at the N.P.L. on big end bearings, and the machine designed and constructed by Ricardo and Co. for the investigation of "load-speed factors" has been delivered and work commenced.

"Anti-knock" chemicals, such as a mixture of tetra-ethyl lead with petrol have been tried, and have been found to enable higher compression ratios to be used, but it was found that after running a short time the engines became jammed, a white deposit being found in the cylinders and extending to the piston rings and even to the seating of the exhaust valves. The Air Ministry Laboratory has been instructed to try to find a substitute for tetra-ethyl lead.

Supercharging and the use of a stratified charge in the cylinders form subjects for investigation, and it is pointed out that the operation evolved by Mr. Ricardo aims at the elimination of all distribution losses by working with a considerable excess of air present in the cylinder. It also provides a means of supercharging whereby the main charge is admitted to the cylinder under atmospheric pressure, so that only the supplementary air need be compressed. The result is that the quantity of air dealt with by the supercharger is reduced to one-half or less, and it is unnecessary to seal or balance the carburettors and induction system. The system also aims at the elimination of the necessity for altitude control, since as the machine rises and the mixture tends to become richer, more and more of the supplementary air supercharge will automatically be brought into use. It is

stated that if no altitude control is used the power output falls off only as the square root of the density instead of directly as the density.

### Air Transport

Under the direction of the Air Transport Sub-Committee a member of the staff of the N.P.L. has commenced a general investigation into the problems of economic flight. The Sub-Committee concludes that for the best economy the size of the present-day civil aeroplane is not the best possible, and a comparison of machines suggests that a considerable decrease in cost per ton-mile would result from an appreciable increase in wing area. It is stated that this increase may be as much as 80 per cent. in some cases, and would result in a large increase in the paying load, other things being equal.

On the subject of meteorology, the report states that it has been recommended that a general and systematic investigation should be made of the atmospheric conditions at some one place, and that flights might be made each day up to 15,000 ft. to ascertain whether there are belts of the air which, on the majority of days, are specially suitable for air transport.

Reliability is considered to be an essential for a satisfactory air transport service, and the report expresses the opinion that increased reliability may be obtained by an increase in the number of engines. The Sub-Committee, therefore, recommends that a modified three-engined machine, or machines, be put into service and thoroughly tried out. Attention is also called to the importance of night flying, and it is stated that the experiments on a Leader Cable are a welcome development towards this end. With regard to the best height at which to fly, it is stated that theoretical considerations indicate that on long flights the most economical height is at the ceiling of the aeroplane.

## FLYING ACCIDENTS IN THE ROYAL AIR FORCE

THE following announcement is made by the Air Ministry:—

Public attention has recently been directed to the question of flying accidents in the Royal Air Force. In order to remove any misconceptions which may consequently have arisen, the Air Ministry point out that comparisons which have been made of the actual number of accidents during the last three years take no account of the increase in the size of the force during this period and the much greater amount of flying which is carried out in all units than was formerly the case. During the period July, 1921, to July, 1924, the number of squadrons has been raised from 34 to 48, and in addition to this the average amount of flying time per pilot has increased by nearly 100 per cent. Again, owing to the expansion of the Royal Air Force now in progress and other factors, the number of pilots under training at the present time is larger than would be required for the existing 48 squadrons, and this has entailed a further material increase in the current volume of flying.

In consequence of these factors, whereas the actual number of accidents in the present year shows an increase upon the corresponding figures for 1923 and 1922, there has none-the-less been a continuous improvement during the last two years in the ratio of hours flown to fatal accidents. Thus, the number of machine hours flown during the 12 months ending June, 1923, for each fatal accident showed an increase of

over 47 per cent. as compared with the 12 months ending June 30, 1922. This improvement was more than maintained during the 12 months ending June, 1924, when there was a further increase of 7 per cent. in the number of hours flown for each fatal accident.

Comprehensive training in the air is essential in order to ensure the attainment of the high standard of skill demanded by active service conditions; in the absence of such training and of ample opportunities for subsequent flying practice, efficiency would be impaired to an extent which could only result in increased casualties in time of war.

These considerations are fully appreciated by the officers and men of the Royal Air Force, but those who are not cognisant of all the facts are naturally prone to draw erroneous deductions in regard to both personnel and material. As regards the latter, while the Air Force is gradually being re-equipped with machines of new design, there is no ground for suggesting that the older designs still in use are in any way unsafe or lacking in airworthiness.

Whenever an accident occurs no pains are spared to ascertain its causes; in addition to the Court of Inquiry convened by the unit concerned, in the case of all accidents at home, specially appointed officers are despatched to investigate every detail on the spot, and report direct to the Air Ministry.

### Round Australia Flight

FURTHER to our reference last week to the second round Australia Flight, the De Havilland Company have received the following cable from Lieut.-Col. Brinsmead:—"50" returned Melbourne as new after 25 days consecutive flight 8,000 miles averaging 4 hours daily in extreme temperatures. Replacements under 30s. Local aviation firms much impressed by remarkable aircraft development demonstrated."

### Further Trials with ZR 3

THE new rigid airship, ZR 3, built by the Zeppelin Co. for America, made its first long distance trial flight on September 6, when a 600-mile flight over Southern Germany, lasting about 10 hours, was successfully accomplished. ZR 3, under the command of Dr. Eckener and piloted by Capt. E. Lehmann, with a total of 85 on board, left Friedrichshafen at 9 a.m., and after a 30-minute cruise over Lake Constance, in order to ascertain if all was in order, the airship headed over the Zugspitz Mountain at Munich. The ZR 3 cruised over Munich for about half an hour, immense crowds turning out to give the airship an enthusiastic welcome, and then flew towards Stuttgart, which was reached at 3.30 p.m. After this the ZR 3 made for home, and a perfect

landing at Friedrichshafen was effected and the ZR 3 safely housed by 7 p.m. During the whole trip the five engines ran splendidly, and a maximum speed of 82 m.p.h. was attained.

### Aircraft in French Manœuvres

It is reported that some 400 aeroplanes are taking part in the French frontier manœuvres in the Sarre district. The "Red" opposing force, in skeleton form, is said to make up what it lacks in infantry by heavy bombing aeroplanes, and owing to the presence of the latter it is expected that the "Blue" attacking force will be forced to do a great deal of night marching.

### Capt. F. W. Merriam

MANY of our readers will, we feel sure, be sorry to learn that our old friend Capt. F. W. Merriam—who has probably taught more people to fly than any other pilot-instructor—is still in very poor health, and is disposing of "Whiteley Bank House," Wroxall, I. of W., where he has resided for many years. Included in some lots to be sold by auction on October 8 in connection with this disposal will be the glider which Capt. Merriam designed and built some little time back.

## ROUND-THE-WORLD FLIGHTS

SINCE our last report on the World-Flights, the American airmen are now back again in their native country, and, as would be expected, have met with exceptionally enthusiastic receptions at Boston and New York, the first two U.S. cities reached on the final stage of this remarkable flight.

After a day's stay at Ictickle, or Indian Harbour, Labrador, where they arrived on August 31, Lieuts. Smith and Nelson resumed their journey at 11.20 a.m. on September 2, and, after a hard fight through rain and fog, arrived safely at Hawkes Bay, Newfoundland. Shortly after 11 a.m. the next day they set forth once more, and again encountered bad weather, with a strong head-wind, which so delayed their progress that a Canadian seaplane set out from Pictou to try and locate them. The seaplane eventually met them and escorted them back to Pictou, where they arrived at 4.30 p.m., having covered the 455 miles in about 6½ hours.

At Pictou, where they received a great reception from a large gathering of people—many of whom had come for miles around to greet them—the American world-flyers were joined by Lieuts. Wade and Ogden on a new machine, replacing that which was lost on the way to Iceland. A day was spent in overhauling the machines at Pictou, and at 10.35 a.m. on September 5 all three machines left for Boston. When about 130 miles from Boston, however, they encountered thick fog, and they were forced to descend in Casco Bay. Thus, they first set foot on U.S. soil, since their departure last March, in comparatively lonely surroundings, where they received a simple, but none the less hearty, welcome from a small gathering of people.

At noon the following day, however, after supplies of fuel had been obtained, they completed the journey to Boston, escorted by about a dozen aeroplanes of General Patrick's squadron. As they landed smoothly in Boston Harbour at 2.10 p.m. everything in the vicinity that could make a noise, made it. Apart from the cheers of some 20,000 spectators, guns from the forts and navy yard boomed, and "hooters" from ships and factories assisted in a great welcome. After calmly looking over their machines meanwhile, the American world-flyers were eventually brought ashore, where a welcoming committee of one hundred officials awaited them! Major-General Patrick, Chief of the Army Air Service, was the first to greet them, to the strains of the "Star-Spangled Banner"—and then followed the ordeal of hand-shaking *ad lib.* Squadron-Leader MacLaren was amongst the first to greet the Americans. There was, of course, much speechifying—including a short speech from Lieut. Smith, which was broadcast by wireless—and presentations, but eventually the six airmen were allowed to retire for a well-earned rest.

The floats of the three Douglas world-cruisers having been replaced by wheels, Lieuts. Smith, Nelson and Wade left Boston for New York, where they arrived, accompanied by an escort of aeroplanes from Mitchell Field, shortly after 3 p.m. Before landing at Mitchell Field the three machines circled over New York, in order to enable the million or so inhabitants to have a glimpse of the world-cruisers. As at Boston, their welcome at New York was an elaborate and enthusiastic affair, and among those to greet the American airmen was H.R.H. the Prince of Wales, who congratulated them in an unofficial capacity—Sir Esmé Howard, the British Ambassador, officially representing Great Britain.

## SMALL TOOLS AT OLYMPIA

UNTIL a visit is paid to an exhibition, such as that which is now open at Olympia, it is not realised to what extent the machine tool industry has grown. When going through a modern works, the impression is that the machinery is supplied by one or two firms. Yet, at Olympia, there are no less than one hundred stands, and one is able to see on every hand wonderful machines which are almost uncanny in the ingenuity of their operation. The largest displays are those of Alfred Herbert, Ltd., and the Selson Engineering Co., Ltd., both of which are little exhibitions in themselves, embracing machines for almost every conceivable operation which has to be carried out in an engineering shop. Another very comprehensive exhibit is that for which Messrs. Burton, Griffiths and Co., Ltd., and B.S.A. Tools, Ltd., are responsible, and even then it does not pretend to include all the tools and appliances which are handled by these firms. Lathes of all sorts are shown by H. W. Ward and Co., while those who specialise in woodwork will find the stand of Wadkin and Co. most intriguing. It is impossible in our pages to give an adequate review of the exhibits, and in addition to the actual machinery there are many other things to be seen which have their own interest, such as the display of Prices Patent Candle Co., Ltd., including lubricants, as well as cutting compounds

and oils; that of the North British Rubber Co., Ltd., showing belts, hose, washers, buffers, and every other engineering accessory or fitting in which rubber is used; that of the W. T. Nicholson and Clipper Co., Ltd., where can be seen belt-lacing machines, belt cutters and files and the Hoffman Manufacturing Co., with its fascinating devices for demonstrating the efficiency of ball and roller bearings.

In opening the exhibition, Lord Askwith, who prior to the ceremony was the chief guest at the inaugural luncheon, said that the necessity for locomotion had been responsible for the great development in the machine-tool industry during the past fifty years, and the possibilities of power were not nearly exhausted, in spite of the remarkable advances that had been made and the fact that they could claim now to produce machine tools and machinery as efficient and as cheap as any country in the world.

Sir Alfred Herbert, President of the Machine Tool Trades Association, the organisers of the exhibition, who took the chair at the luncheon, said that they had passed through a period of after-war depression, but during the past twelve months there had been a steady and marked improvement. All British industry in the last resort depended upon the machine-tool trade; in the best sense of the word it was the foundation of industry. Money spent on machine tools was well spent. His advice was: "Buy early and often. Work them well and wear them out if you can, and by that time we shall be able to show you more efficient and complete machines than we have ever had before."

The exhibition remains open until the 27th inst., and all concerned with aeroplane building or engine construction should make a point of visiting it.

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## SOCIETY OF MODEL AERONAUTICAL ENGINEERS

A COUNCIL meeting will be held at 29, Southampton Buildings, London, W.C.2, on Friday, September 12, at 6.30 p.m. prompt.

Country members who are entering the competition for self-righting gliders which is to be held early in October should send their models to Mr. W. E. Evans, the Hon. Secretary of the Research Committee, 20, Thurlby Road, Wembley, not later than Friday, October 3.

Programmes of lectures for the winter session will be distributed to members at an early date.

A. E. JONES, Hon. Sec.

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## AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations: Cyl. = cylinder; i.c. = internal combustion; m. = motor. The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

### APPLIED FOR IN 1923

Published September 4, 1924

- 13,020. J. A. PRESTWICH. Valve gear for i.c. engines. (220,088.)  
 20,101. V. C. RICHMOND and G. H. SCOTT. Aircraft. (220,164.)  
 22,593. LUFTSCHIFFBAU ZEPPELIN GES. Gas-conducting means for rigid airships. (203,707.)  
 23,545. SOC. ANON. DES ATELIERS D'AVIATION L. BREGUET. Radiators for aviation engines. (205,475.)

Published September 11, 1924

- 4,957. H. E. S. HOLT. Holt landing lights or flares for attaching to aircraft. (220,338.)  
 12,899. SOC. ANON. NIEUPORT-ASTRA. Flying-machines. (199,005.)  
 13,170. D. J. MOONEY. Metal framework for aircraft. (220,383.)  
 13,515. A. L. MCKELVEY. Aircraft. (220,394.)  
 15,905. ROHRBACH METALL-FLUGZEUGBAU GES. Monoplane with a plurality of motors. (205,049.)

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